IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of : HONEYWELL INTERNATIONAL, INC.

Docket No. H25210

Serial No.: 09/832,965

Art Unit No. 2871

Filing Date : April 11, 2001

Examiner: Dung T. Nguyen

Invention Title: POLARIZED DISPLAY WITH WIDE ANGLE ILLUMINATION

AFFIDAVIT OF BRENT D. LARSON

1. My name is Brent D. Larson. I am a physicist employed by Honeywell International Inc. I have worked in the areas of optics and liquid crystals for 25 years, including 17 years directly with display technology. I earned my doctorate in physics through the study of optical properties of liquid crystals. I am inventor and co-inventor on eleven patents in the field of displays. I have expert knowledge of the art practiced in the display industry and the art area of the subject patent application.

2. Attached is my Curriculum Vitae.

3. The examiner for the Honeywell patent application entitled POLARIZED DISPLAY WITH WIDE ANGLE ILLUMINATION, herein referred to as "the present invention," has asserted on various grounds that said application lacks novelty as being anticipated or unpatentable over Sharp et al. (US Patent 5,999,240) and Larson (US Patent 5,751,288), a patent of which I am the inventor. I dispute the assertions of the Examiner for a number of reasons. My reasons are as follows:

a. The present claims at issue specifically claim the feature of a polarization rotating element being proximate an exterior surface of the polarized display panel. This feature is not taught, mentioned or implied by the cited prior art.

b. A mere variable retarder is not the same as a "polarized display panel" as described in the written specification of the present patent application.

c. Sharp in Fig. 2a, shows a polarization modulator, 10 (e.g., a liquid crystal cell), with front and rear polarizers, 40 and 50, and polarization rotating elements 20 and 30. The polarization rotating elements are retardation films contained internally to the polarized display device, which consists of all of the elements of Fig. 2a. As previously described in the last office action response, a variable retarder (in that case, an active matrix FLC) does not provide polarized display panel functionality on its own. It requires the additional polarizers. In our last response, we provided a number of references to our specification to support that definition of "polarized display panel" as used in our claims.

d. When including the additional polarizers of Fig 2a with the liquid crystal cell 10, in order to meet the definition of a "polarized display panel", it is obvious that the polarization rotating elements 20 and 30 are clearly not proximate the exterior of the polarized display panel. Rather, they are clearly inside of the polarized display panel, and thereby quite distinct from the present invention.

e. Modulator 10 is not a "polarized display panel", despite Sharp's use of the term "LCD" in describing modulator 10. The term LCD is typically used in the art to refer to a Liquid Crystal Display, where a display is a device or system capable of displaying information in a manner

suitable for viewing. Sharp, however, uses the term "LCD" more broadly. See column 11, lines 30-37, "the term LCD is used for any liquid crystal device which contains a liquid crystal cell having one or more pixels". He goes on to provide useful limitations on modulator 10, however, by saying "The LCD is typically a multi pixel array of liquid crystal cells where each pixel can be independently controlled." No mention is made of any polarizers being included with the cells in the LCD, or its ability to modulate any property of light other than polarization. As further evidence that Sharp is using the term LCD to describe a variable retarder or similar polarization modulator, lines 36-37 states that, "The retardances of a single pixel of an LCD are labeled in FIG. 2".

f. Further, it is readily evident to one skilled in the art that the described utility of Sharp's invention in FIG. 2a requires that element 10 function as a polarization modulator, thereby making it distinctly different from the "polarized display panel" of the present invention.

g. Several other references to modulator 10 support its role as a variable retarder which modulates polarization. Column 7, lines 45-47 state that "Polarization modulator 60 is formed by modulator 10 in combination with retarder stack 20". Using the polarized input light from polarizer 40 and adding polarization analyzer 70 forms a filter (column 7, lines 47-50), which modulates intensity of the light (see column 10, line 47). Note that "analyzer" is a term often applied to a polarizer, which is used to convert polarization

modulation (which is not visible to the eye) into intensity or amplitude modulation.

h. In the context of FIG. 1, column 7, lines 60-65 teach that light of one polarization is transmitted with a polarization that does not vary with the voltage applied, while light with another polarization is modulated into a different polarization. Column 7, line 66 through column 9, line 15 go on to describe various types of suitable polarization modulator types, and include the introductory statement "The modulator is a device which controls the state of polarization of transmitted light with the application of a voltage". This is extended to modulator 10 of Fig. 2 in column 10, lines 56-59. In other words, the modulator 10 of Sharp is not a polarized display panel according to the present invention, and therefore does not anticipate any of the claims of the present invention.

Further, Affiant sayeth naught.

Brent D. Larson

STATE OF ARIZONA)
) ss.
COUNTY OF MARICOPA)

SUBSCRIBED AND SWORN to before me this 18th day of Dec. 2003, by BRENT D. LARSON.

Cynthia A. Langrall
NOTARY PUBLIC

CYNTHIA A. LANGRALL
Notary Public - Arizona
MARICOPA COUNTY
My Commission Expires
NOVEMBER 11, 2006

My Commission Expires:

11/11/2006

Curriculum Vitae
Brent D. Larson

Current Address:

Honeywell International, Inc.
21111 N. 19th Avenue
Phoenix, AZ 85027

Education:

1986 Ph.D., Massachusetts Institute of Technology, Cambridge, MA
Experimental Condensed Matter Physics

Karl Taylor Compton Fellow, Research Assistant.

1978 B.A., Gustavus Adolphus College, St. Peter, MN
Physics and Mathematics majors

Summa Cum Laude, National Merit Scholarship, Minnesota State Scholarship, Crawford Memorial Physics Award, Iota Delta Gamma Honorary Scholastic Society, Holcomb Research Fellow and Albert G. Swanson Award, Guild of St. Ansgar, Kaufmanis Mathematics Award, minors in music and computer science.

Experience:

4/91 to present Honeywell International, Inc., Phoenix, AZ
Senior Staff Scientist, Displays Center of Excellence

Development of display concepts, prototypes and enabling technologies for head down, head up and head mounted avionic displays. Specific emphasis on display optics, optical modeling, optical performance characterization, enhanced LCD technologies, compensation films, backlights and optical components. Recipient of four annual Technical Achievement Awards.

9/86-4/91 Mead Imaging, Miamisburg, OH
Senior Physicist, Imaging Systems Group

Developed, adapted and applied laser-addressed liquid crystal technology and other light modulator technologies for use with a photopolymerization based full color output medium.

5/86-8/86	Massachusetts Institute of Technology, Postdoctoral Associate, Department of Physics	Cambridge, MA

Performed research in liquid crystal physics.

5/78-5/86	Massachusetts Institute of Technology, Research Assistant	Cambridge, MA

Studied critical behavior near phase transitions in micellar liquid crystals, using quasi-elastic light scattering and optical birefringence techniques. Investigated properties of thermotropic liquid crystal systems, dye solutions and red blood cell membranes by means of picosecond laser spectroscopy and other optical methods.

Patents, Publications:

US Patent 6,597,504, "Optical devices employing beam folding with polarizing splitters"
US Patent 6,469,830, "Display screen and method of manufacture therefor
US Patent 6,392,727, "Reduced reflectance polarized display"
US Patent 6,310,671, "Polarization sensitive scattering element"
US Patent 6,278,546, "Display screen and method of manufacture therefor"
US Patent 5,999,239, "Method for making a polarization-sensitive optical element"
US Patent 5,751,388, "High efficiency polarized display"
US Patent 5,594,563, "High resolution subtractive color projection system"
US Patent 5,564,810, "Full color stereoscopic display with color multiplexing"
US Patent 5,563,727, "High aperture AMLCD with nonparallel alignment of addressing lines to the pixel edges or with distributed analog processing at the pixel level"
US Patent 5,418,584, "Retroreflective array virtual image projection screen"
US Patent 4,992,803, "Simultaneous laser writing of multiple LALC cells"
US Patent 4,912,505, "Contrast control device for a slit-type copier exposure system"

Larson, B., Dubin, M, Kolosowsky, A., Flegal, T., "Image Noise in High Resolution Rear Projection Screens", Proc. SPIE Vol. 4712, p. 202-211, Cockpit Displays IX: Displays for Defense Applications, Darrel G. Hopper, Ed., 2002.

Kolosowsky, A., Larson, B., Dubin, M., "Image Noise in High Resolution Rear Projection Screens", SID Microdisplays 2001 Digest of Papers, pp. 31-34, 2001.

Larson, Brent D., "Multilevel Printing with the Microencapsulated Color Imaging System", DATEK Sixth National Print Quality Seminar, October 1987.

Larson, Brent D., "Critical Behavior in Micellar Liquid Crystals", Ph. D. Dissertation, Department of Physics, Massachusetts Institute of Technology, Cambridge, Massachusetts, May 1986.

Larson, B.D., Litster, J.D., "Nematic Ordering in Lyotropic Liquid Crystals", Molecular Crystals Liquid Crystals, Vol. 113, pp. 13-24, 1984.